

AMENDMENTS TO THE CLAIMS

Please cancel claims 1-10 without prejudice to or disclaimer of the subject matter therein.

Please add claims 18-28 to read as follows. Note that all the claims currently pending in this application, including those not presently being amended, have been reproduced below for the Examiner's convenience.

1-10. (Cancelled)

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11. (Previously Presented) A semiconductor device manufacturing method comprising the steps of:

installing manufacturing apparatuses comprising an optical system having a plurality of spaces and a mechanism that fills each of the spaces with a gas, a gas contained at least in one of the plurality of spaces has a refractive index different from that of a gas contained at least in one of the remaining spaces, and a pressure of the gas at least in the one of the plurality of spaces is different from that of the gas at least in the one of the remaining spaces; and

manufacturing a semiconductor device in a plurality of processes by using the manufacturing apparatuses.

12. (Previously Presented) The method according to claim 11, further comprising the steps of
connecting the manufacturing apparatuses by a local area network, and

communicating information about at least one of the manufacturing apparatuses between the local area network and an external network of the semiconductor manufacturing factory.

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13. (Previously Presented) The method according to claim 12, wherein maintenance information of the manufacturing apparatus is acquired by data communication by accessing a database provided by a vendor or user of the exposure apparatus via the external network, or production is managed by data communication via the external network with a semiconductor manufacturing factory other than the semiconductor manufacturing factory.

14. (Previously Presented) A semiconductor manufacturing factory comprising:
manufacturing apparatuses for various processes, including an exposure apparatus comprising an optical system having a plurality of spaces and a mechanism that fills each of the spaces with a gas, a gas contained at least in one of the plurality of spaces has a refractive index different from that of a gas contained at least in one of the remaining spaces, and a pressure of the gas at least in the one of the plurality of spaces is different from that of the gas at least in the one of the remaining spaces;

a local area network for connecting said manufacturing apparatuses; and
a gateway for allowing the local area network to access an external network of said factory,

wherein information about at least one of said manufacturing apparatuses is communicated by connection to the external network.

15. (Previously Presented) A maintenance method for an exposure apparatus installed in a semiconductor manufacturing factory and comprising an optical system having a plurality of spaces and a mechanism that fills each of the spaces with a gas, a gas contained at least in one of the plurality of spaces has a refractive index different from that of a gas contained at least in one of the remaining spaces, and a pressure of the gas at least in the one of the plurality of spaces is different from that of the gas at least in the one of the remaining spaces, comprising the steps of:

causing a vendor or user of the exposure apparatus to provide a maintenance database connected to an external network of the semiconductor manufacturing factory;

A26 authenticating access from the semiconductor manufacturing factory to the maintenance database via the external network; and

transmitting maintenance information accumulated in the maintenance database to the semiconductor manufacturing factory via the external network.

16. (Previously Presented) An exposure apparatus comprising an optical system having a plurality of spaces and a mechanism that fills each of the spaces with a gas, a gas contained at least in one of the plurality of spaces has a refractive index different from that of a gas contained at least in one of the remaining spaces, and a pressure of the gas at least in the one of the plurality of spaces is different from that of the gas at least in the one of the remaining spaces, comprising:

a display;

a network interface; and

a computer for executing network software,

wherein maintenance information to the exposure apparatus is communicated via a computer network.

126 17. (Previously Presented) The apparatus according to claim 16, wherein the network software is connected to an external network of a factory where the exposure apparatus is installed, provides on said display a user interface for accessing a maintenance database provided by a vendor or user of the exposure apparatus, and enables obtaining information from the database via the external network.

18. (New) An exposure apparatus comprising:

a first space filled with a helium gas; and

a second space filled with a nitrogen gas,

wherein a pressure of the first space is higher than that of the second space.

19. (New) The apparatus according to claim 18, wherein the first and second spaces are adjacent to each other.

20. (New) The apparatus according to claim 19, wherein the first and second spaces are adjacent to each other via an optical element.

21. (New) The apparatus according to claim 18, wherein the pressure difference between the first and second spaces is not more than 1,000 Pa.

22. (New) The apparatus according to claim 18, further comprising:

a helium gas supply means for supplying the helium gas into the first space;

a first exhaust means for exhausting an internal gas of the first space;

a nitrogen gas supply means for supplying the nitrogen gas into the second space; and

a second exhaust means for exhausting an internal gas of the second space.

23. (New) The apparatus according to claim 18, further comprising a projection optical system for projecting exposure light from a pattern to an object to be exposed, wherein the first and second spaces are formed in the projection optical system.

24. (New) The apparatus according to claim 18, wherein the first space is substantially closed except for an opening portion of the helium gas supply means and the first exhaust means.

25. (New) The apparatus according to claim 24, further comprising:
a detection unit which detects the pressure of the first space; and
an operation unit which operates the pressure of the first space based on the detection result of the detection unit.

26. (New) The apparatus according to claim 18, wherein the second space is substantially closed except for an opening portion of the nitrogen gas supply means and the second exhaust means.

27. (New) The apparatus according to claim 26, further comprising:
a detection unit which detects the pressure of the second space; and
an operation unit which operates the pressure of the second space based on the
detection result of the detection unit.

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28. (New) A device manufacturing method comprising:
exposing the object by using the exposure apparatus according to claim 18; and
developing the exposed object.
